

WHAT IS CLAIMED IS:

1. A method for communicating a signal, comprising:

establishing one or more quality indicators at a first communication device,  
the first communication device comprising a plurality of antenna elements, the one or  
5 more quality indicators indicating a quality of one or more communication links  
between the first communication device and one or more second communication  
devices;

determining a modification according to the one or more quality indicators, the  
modification describing at least one adjustment of one or more modulation features of  
10 a plurality of modulation features for a frequency subband;

modulating at least a subset of a plurality of signals in accordance with the  
modification, a signal of the plurality of signals associated with an antenna element of  
the plurality antenna elements, a signal of the plurality of signals having the frequency  
subband; and

15 sending the plurality of signals from the plurality of antenna elements to yield  
a transmitted signal.

2. The method of Claim 1, wherein establishing the one or more quality  
indicators at the first communication device further comprises:

20 receiving at the first communication device one or more quality indication  
signals; and

establishing the one or more quality indicators according to the one or more  
quality indication signals.

25 3. The method of Claim 1, wherein establishing the one or more quality  
indicators at the first communication device further comprises:

detecting the quality of the communication link; and

calculating the one or more quality indicators according to the quality.

4. The method of Claim 1, wherein at least one of the one or more second communication devices comprises a plurality of second antenna elements.

5 5. The method of Claim 1, wherein at least one of the one or more communication links is configured according to a Multiple-Input-Multiple-Output (MIMO) communications protocol.

10 6. The method of Claim 1, wherein the one or more communication links are configured according to at least one of a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol.

15 7. The method of Claim 1, wherein the modification is associated with an improvement of the transmitted signal, the improvement comprising at least one of the following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced network load, and reduced RF interference.

20 8. The method of Claim 1, wherein the modification describes the at least one adjustment of the one or more modulation features for a signal of the subset of signals.

25 9. The method of Claim 1, wherein the plurality of modulation features comprise a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element.

10. The method of Claim 1, wherein determining the modification according to the one or more quality indicators further comprises:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained;

adjusting the second set while maintaining the first set; and

adjusting the first set while maintaining the second set until a second steady state is obtained.

11. The method of Claim 1, wherein:

establishing the one or more quality indicators at the first communication device further comprises receiving one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators;

determining the modification according to the one or more quality indicators further comprises:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-control bit at a first time period corresponds to a second bit value for a power-control bit at a second time period; and

adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value.

12. The method of Claim 1, wherein:

the first communication device comprises a subscriber communication device; and

the one or more second communication devices comprise one or more base stations.

13. The method of Claim 1, wherein:  
the first communication device comprises a base station; and  
the one or more second communication devices comprise one or more  
subscriber communication devices.

5

14. The method of Claim 1, wherein:  
the first communication device comprises a first base station; and  
the one or more second communication devices comprise one or more second  
base stations.

10

15. The method of Claim 1, wherein:  
the first communication device comprises a first subscriber communication  
device; and  
the one or more second communication devices comprise one or more second  
subscriber communication devices.

15

16. A system for communicating a signal, comprising:

a first communication device operable to establish one or more quality indicators, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices, the first communication device comprising:

a plurality of antenna elements; and

a signal modifier operable to:

determine a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband;

modulate at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and

send the plurality of signals to the plurality of antenna elements to yield a transmitted signal.

17. The system of Claim 16, the first communication device further operable to establish the one or more quality indicators by:

receiving at the first communication device one or more quality indication signals; and

establishing the one or more quality indicators according to the one or more quality indication signals.

18. The system of Claim 16, further comprising a quality indicator generator operable to establish the one or more quality indicators at the first communication device by:

detecting the quality of the communication link; and

calculating the one or more quality indicators according to the quality.

19. The system of Claim 16, wherein at least one of the one or more second communication devices comprises a plurality of second antenna elements.

5 20. The system of Claim 16, wherein at least one of the one or more communication links is configured according to a Multiple-Input-Multiple-Output (MIMO) communications protocol.

10 21. The system of Claim 16, wherein the one or more communication links are configured according to at least one of a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol.

15 22. The system of Claim 16, wherein the modification is associated with an improvement of the transmitted signal, the improvement comprising at least one of the following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced network load, and reduced RF interference.

20 23. The system of Claim 16, wherein the modification describes the at least one adjustment of the one or more modulation features for a signal of the subset of signals.

25 24. The system of Claim 16, wherein the plurality of modulation features comprise a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element.

25. The system of Claim 16, the signal modifier operable to determine the modification according to the one or more quality indicators by:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained;

adjusting the second set while maintaining the first set; and

adjusting the first set while maintaining the second set until a second steady state is obtained.

26. The system of Claim 16, wherein:

the first communication device is operable to establish the one or more quality indicators at the first communication device by receiving one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators;

the signal modifier is operable to determine the modification according to the one or more quality indicators by:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-control bit at a first time period corresponds to a second bit value for a power-control bit at a second time period; and

adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value.

27. The system of Claim 16, wherein:

the first communication device comprises a subscriber communication device; and

the one or more second communication devices comprise one or more base stations.

28. The system of Claim 16, wherein:  
the first communication device comprises a base station; and  
the one or more second communication devices comprise one or more  
subscriber communication devices.

5

29. The system of Claim 16, wherein:  
the first communication device comprises a first base station; and  
the one or more second communication devices comprise one or more second  
base stations.

10

30. The system of Claim 16, wherein:  
the first communication device comprises a first subscriber communication  
device; and  
the one or more second communication devices comprise one or more second  
subscriber communication devices.

15



31. Logic for communicating a signal, the logic embodied in a medium and operable to:

establish one or more quality indicators at a first communication device, the first communication device comprising a plurality of antenna elements, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices;

determine a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband;

modulate at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and

send the plurality of signals from the plurality of antenna elements to yield a transmitted signal.

32. The logic of Claim 31, operable to establish the one or more quality indicators at the first communication device by:

receiving at the first communication device one or more quality indication signals; and

establishing the one or more quality indicators according to the one or more quality indication signals.

33. The logic of Claim 31, operable to establish the one or more quality indicators at the first communication device by:

detecting the quality of the communication link; and

calculating the one or more quality indicators according to the quality.

34. The logic of Claim 31, wherein at least one of the one or more second communication devices comprises a plurality of second antenna elements.

5 35. The logic of Claim 31, wherein at least one of the one or more communication links is configured according to a Multiple-Input-Multiple-Output (MIMO) communications protocol.

10 36. The logic of Claim 31, wherein the one or more communication links are configured according to at least one of a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol.

15 37. The logic of Claim 31, wherein the modification is associated with an improvement of the transmitted signal, the improvement comprising at least one of the following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced network load, and reduced RF interference.

20 38. The logic of Claim 31, wherein the modification describes the at least one adjustment of the one or more modulation features for a signal of the subset of signals.

25 39. The logic of Claim 31, wherein the plurality of modulation features comprise a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element.

40. The logic of Claim 31, operable to determine the modification according to the one or more quality indicators by:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained;

adjusting the second set while maintaining the first set; and

adjusting the first set while maintaining the second set until a second steady state is obtained.

41. The logic of Claim 31, operable to:

establish the one or more quality indicators at the first communication device by receiving one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators;

determine the modification according to the one or more quality indicators by:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-control bit at a first time period corresponds to a second bit value for a power-control bit at a second time period; and

adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value.

42. The logic of Claim 31, wherein:

the first communication device comprises a subscriber communication device;

and

the one or more second communication devices comprise one or more base stations.

43. The logic of Claim 31, wherein:  
the first communication device comprises a base station; and  
the one or more second communication devices comprise one or more  
subscriber communication devices.

5

44. The logic of Claim 31, wherein:  
the first communication device comprises a first base station; and  
the one or more second communication devices comprise one or more second  
base stations.

10

45. The logic of Claim 31, wherein:  
the first communication device comprises a first subscriber communication  
device; and  
the one or more second communication devices comprise one or more second  
subscriber communication devices.

15

46. A system for communicating a signal, comprising:

means for establishing one or more quality indicators at a first communication device, the first communication device comprising a plurality of antenna elements, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices;

means for determining a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband;

means for modulating at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and

means for sending the plurality of signals from the plurality of antenna elements to yield a transmitted signal.

47. A method for communicating a signal, comprising:

5 establishing one or more quality indicators at a first communication device, the first communication device comprising a plurality of antenna elements, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices, at least one of the one or more communication links configured according to at least one of a Multiple-Input-Multiple-Output (MIMO) communications protocol, a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a  
10 Frequency Division Multiple Access (FDMA) protocol, at least one of the one or more second communication devices comprising a plurality of second antenna elements, the first communication device comprising at least one of a first subscriber communication device and a first base station, the one or more second communication devices comprising at least one of a second subscriber communication device and a second base station, the one or more quality indicators established at the first communication device by performing at least one of the following:

receiving at the first communication device one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators, and establishing the one or more quality indicators according to the one or more quality indication signals; and  
20

detecting the quality of the communication link, and calculating the one or more quality indicators according to the quality;

determining a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband, the plurality of modulation features comprising a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element, the  
25 modification associated with an improvement of the transmitted signal, the improvement comprising at least one of the following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced  
30

network load, and reduced RF interference, the modification describing the at least one adjustment of the one or more modulation features for a signal of the subset of signals, the modification determined according to the one or more quality indicators by performing at least one of the following:

5                   adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained, adjusting the second set while maintaining the first set, and adjusting the first set while maintaining the second set until a second steady state is obtained; and

10                   adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-control bit at a first time period corresponds to a second bit value for a power-control bit at a second time period, and adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value;

15                   modulating at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and

20                   sending the plurality of signals from the plurality of antenna elements to yield a transmitted signal.